

# Prof. Jagdish Narayan (NCSU), DMR-Award # 0803663

## Integration of VO<sub>2</sub> with Si (100)

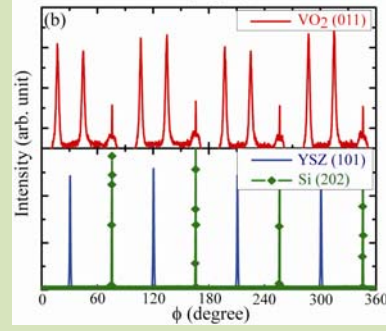
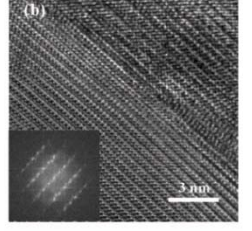
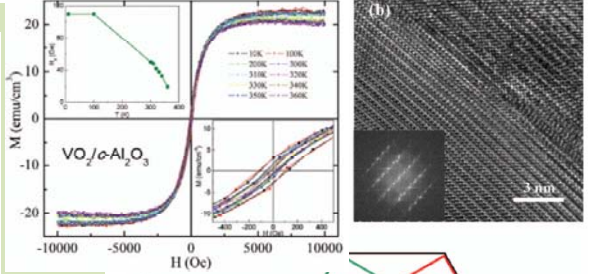
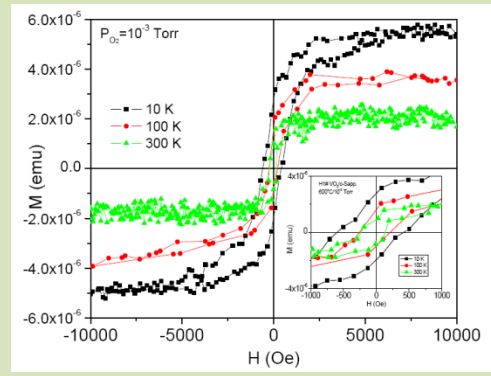
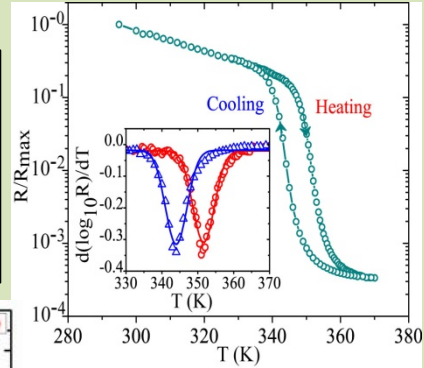
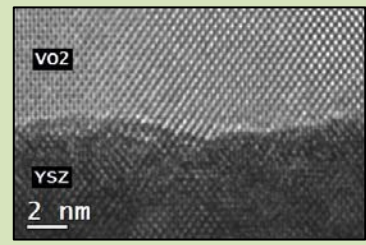
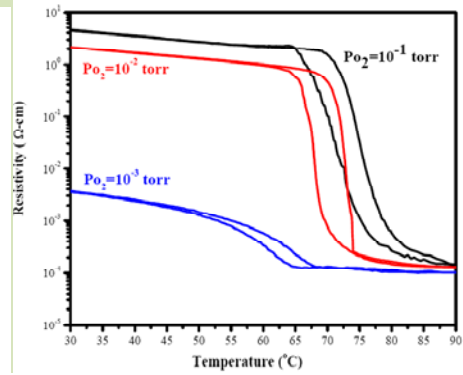
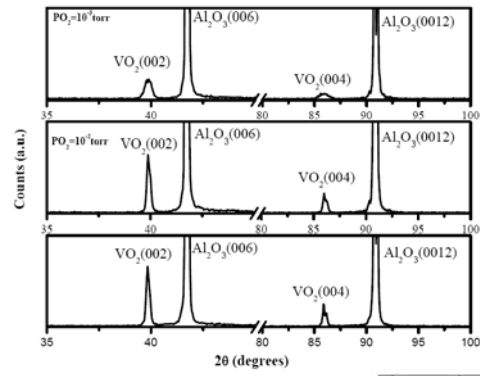
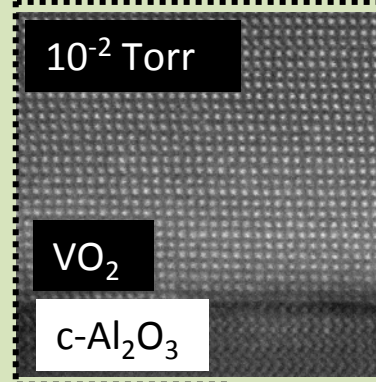
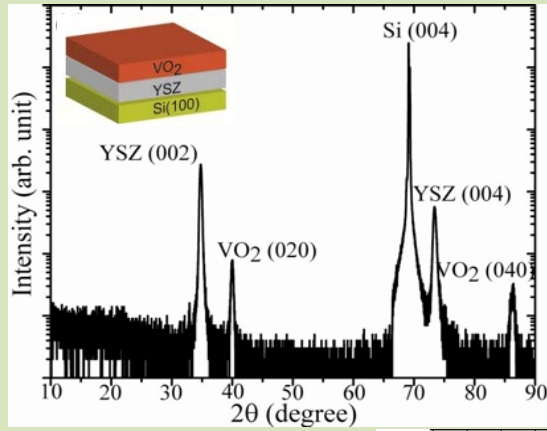
### Motivation

- It has been a major challenge to integrate epitaxial VO<sub>2</sub> films on Silicon (100) to enable smart sensor technology.

## Magnetism in VO<sub>2</sub> and Pressure Effects

### Motivation

- Investigate the role of oxygen vacancies on the SMT characteristics and ferromagnetism of VO<sub>2</sub>.



### Conclusions

- Epitaxial integration of VO<sub>2</sub> thin films with Si (100) using tetragonal/cubic YSZ as intermediate layer.
- All layers grow via domain matching epitaxy.

### Conclusions

- Ferromagnetism in VO<sub>2</sub> thin films with a saturation magnetization of ~18 emu/cm<sup>3</sup> and coercivity of 40 Oe.
- New functionality (magnetic property) and integration with electrical and optical properties of VO<sub>2</sub>.

